Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

PHYSICS 0625/2

PAPER 2

MAY/JUNE SESSION 2001 1 hour

Candidates answer on the question paper.
No additional materials required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
You may lose marks if you do not show your working or if you do not use appropriate units.
Take the weight of 1 kg to be 10 N (i.e. acceleration of free fall = 10 m/s^2).

FOR EXAMINER'S USE

This question paper consists of 13 printed pages and 3 blank pages.

[Turn over

1 A machine operator is making metal cylinders. The factory inspector wants to check whether the machine operator is working fast enough.

(a) He tells the operator to start working when the clock on the wall of the factory shows the time in Fig. 1.1.

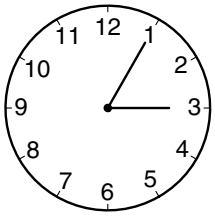


Fig. 1.1

What time is this? Tick **one** box.

3.01 ☐

1.03 ☐

3.05 ☐

5.03 ☐

[1]

(b) The operator is told to stop when the clock shows the time in Fig. 1.2.

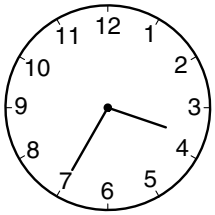


Fig. 1.2

What time is this? Tick **one** box.

3.07 ☐

7.03 ☐

3.35 ☐

4.35 ☐

[1]

(c) How long did the test take?

length of test = ... minutes [1]

(d) During this time, the operator makes 5 cylinders. What is the average time to make one cylinder?

time to make one cylinder = ... minutes [2]

2 **(a)** What is meant by the term *moment of a force*?

.....

.....[2]

(b) The sawn-off branch of a tree is laid across a log.

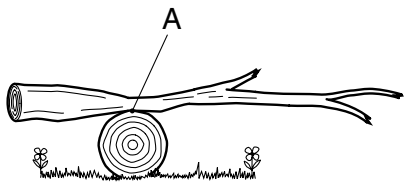


Fig. 2.1

The branch balances when point A is in contact with the log.

(i) How does the moment of the part of the branch to the left of **A** compare with the moment of the part to the right of **A**?

.....

(ii) On Fig. 2.1, mark clearly, using the letter **X**, the centre of mass of the whole branch.

[2]

3 A rubber balloon is filled with air.

(a) Describe how the pressure in the balloon is caused by the air molecules.

.....

.....[3]

(b) The temperature of the air in the balloon increases.

(i) What happens to the air molecules?

.....

.....

(ii) What happens to the pressure in the balloon, and why?

what happens .....

.....

why .....

.....

[3]

4 Fig. 4.1 shows the view from above of a triangular object on one side of a vertical mirror.

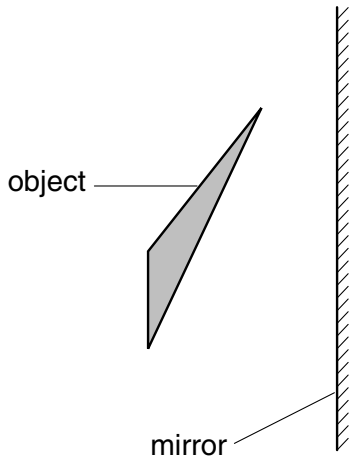


Fig. 4.1

On Fig. 4.1, carefully draw the image formed by the mirror. [3]

5 Fig. 5.1 represents a wave.

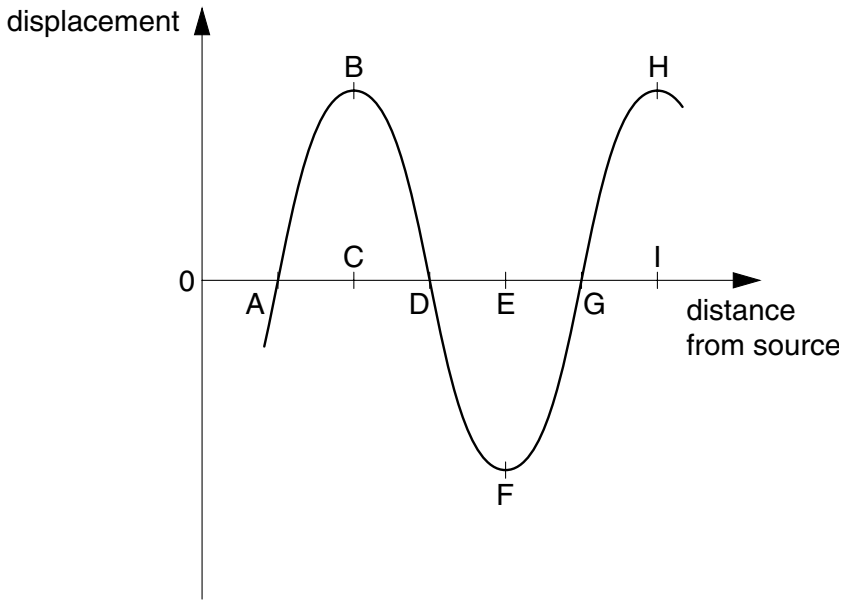


Fig. 5.1

(a) Making use of the letters on Fig. 5.1, state which distances you would measure to find

(i) the wavelength of the wave: measure between …… and …… .

(ii) the amplitude of the wave: measure between …… and …… .

[2]

(b) What is meant by the *frequency* of the wave?

.....

.....[2]

(c) One complete wave takes 0.2 s to generate.

Calculate the frequency of the wave.

frequency of wave = ...Hz [2]

6 A charged ebonite rod has negative charges all over its surface. It is held above three small pieces of aluminium foil, one positively charged, one negatively charged and one uncharged. This is shown in Fig. 6.1.

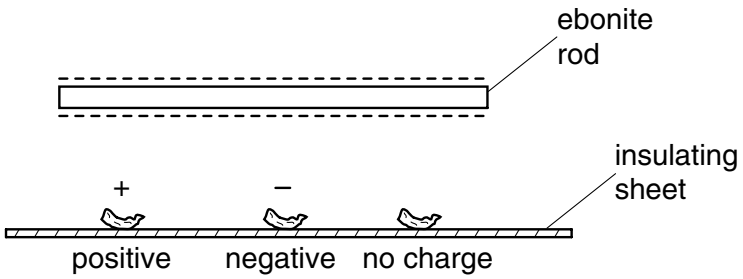


Fig. 6.1

(a) Put a circle around any of the pieces of aluminium which are attracted by the ebonite rod. [2]

(b) Ebonite is an insulator. What is meant by the term *insulator*?

.....

.....[2]

(c) Write down the name of another insulating material.

.....[1]

7 Three resistors are connected in series between X and Y. When a cell is connected across XY, the current at X is 0.1 A, as shown in Fig. 7.1.

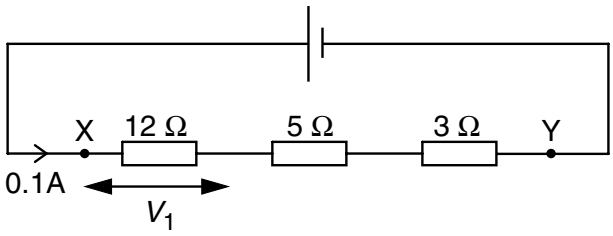


Fig. 7.1

(a) What is the value of the current at Y? ..... A [1]

(b) Calculate V_1, the p.d. across the 12 Ω resistor.

p.d. across the 12 Ω resistor = ...V [2]

(c) What instrument would you use to measure the p.d. V_1? .....[1]

(d) How does the e.m.f. of the cell compare with your answer to part **(b)**? Tick one box.

e.m.f. of cell is larger than V_1 ☐

e.m.f. of cell is smaller than V_1 ☐

e.m.f. of cell is the same as V_1 ☐ [1]

(e) Calculate the combined resistance of the three resistors.

combined resistance = ... Ω [2]

For Examiner's Use

8 **(a)** Fig. 8.1 shows a simple transformer.

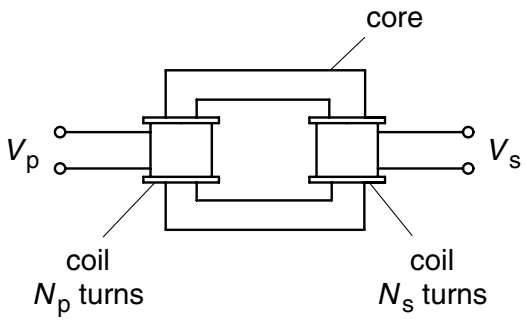


Fig. 8.1

Complete the following sentences about the transformer.

'The transformer only works using …… current.

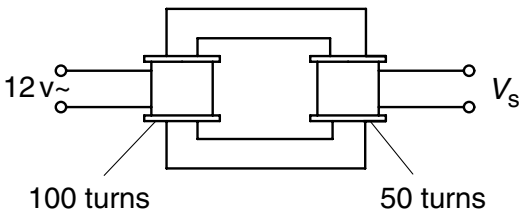
It steps the potential difference up or down according to the equation

$$\frac{V_p}{V_s} = \text{\_\_\_\_\_} .$$

The core of the transformer is made of …… .' [3]

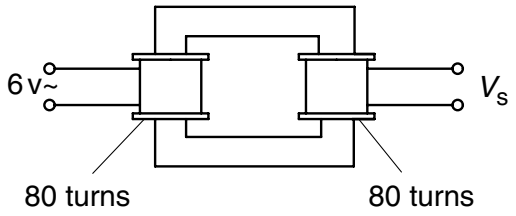
(b) In each of the following examples, state the potential difference V_s.

(i)



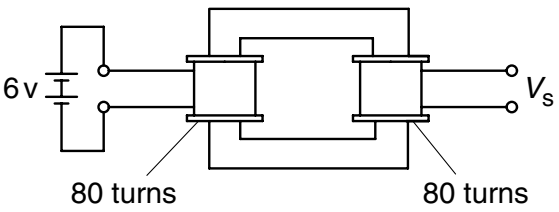
V_s = ... V

(ii)



V_s = ... V

(iii)



V_s = ... V
[4]

9 The table below gives some data about an accelerating car.

time/s	0	1	2	3	4	6	8	10
speed / m/s	0	5	10	15	19	24	25	25

(a) On Fig. 9.1, plot the speed/time graph for the motion.

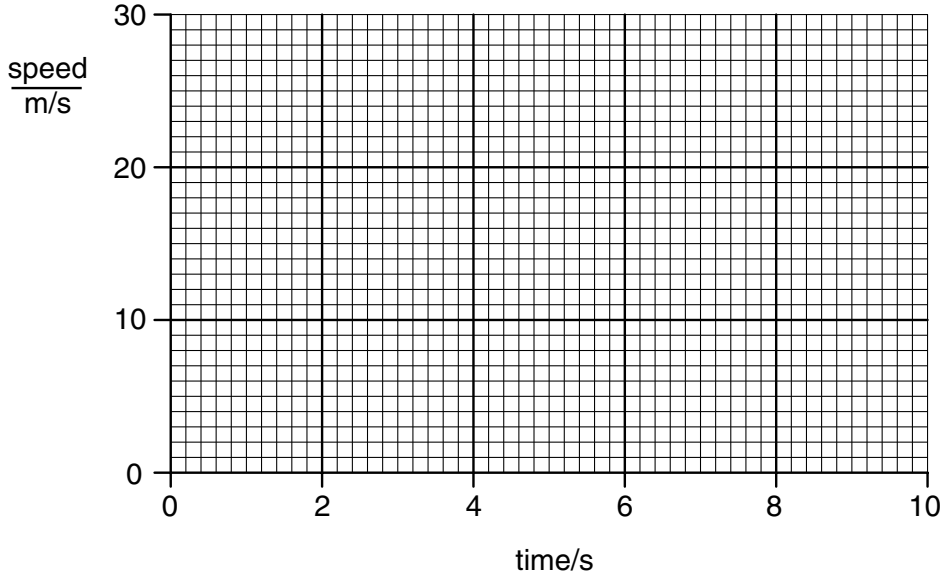


Fig. 9.1 [4]

(b) How far did the car travel during the first 3 s?

distance travelled = ...m [3]

(c) What was the top speed of the car? .....m/s [1]

(d) How far would the car travel in 3 s if travelling at its top speed?

distance travelled = ...m [3]

10 Two workers, **A** and **B**, are lifting boxes of food in a store-room. The boxes all weigh the same and are lifted from the floor on to the same shelf.

A is able to lift 10 boxes in 2 minutes.

B takes longer than 2 minutes to lift 10 boxes.

(a) How does the total work done by **A** compare with the total work done by **B**?

.....[1]

(b) How does the power of **A** compare with the power of **B**?

.....[1]

(c) **(i)** Which form of energy in their bodies do the workers transform in order to do the work lifting the boxes?

.....

(ii) From what did they obtain this supply of energy?

.....
[2]

(d) The boxes have more energy when they are on the shelf than when they were on the floor.

Which form of energy has increased?.....[1]

(e) One of the boxes falls off the shelf and crashes to the ground.

Describe the energy changes as the box falls and hits the ground.

.....

.....

.....[4]

11 **(a)** A builder is building a brick wall. He has 500 bricks delivered, all neatly stacked together.

Each brick measures 0.2 m x 0.1 m x 0.06 m and is a solid block, as shown in Fig. 11.1.

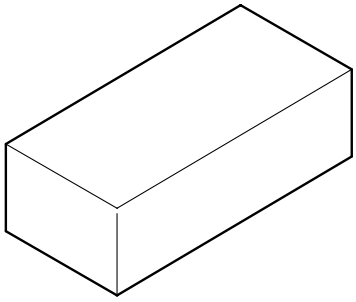


Fig. 11.1

(i) Calculate the volume of one brick.

volume of one brick = …….....

(ii) The brick has a density of 2400 kg/m^3.
Show that the mass of one brick is 2.88 kg.

(iii) What is the mass of the stack of bricks?

mass of stack = ... kg
[6]

(b) Some other bricks have the same size and are made of the same material, but they have a hollow in one face, as shown in Fig. 11.2.

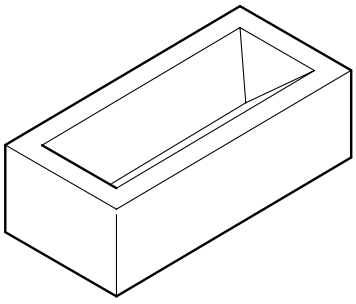


Fig. 11.2

(i) How does the mass of one of these bricks compare with the mass of one of the bricks in **(a)(ii)**?

.....

[Turn over

(ii) The hollow of one brick is filled level with wet cement, as shown in Fig. 11.3.

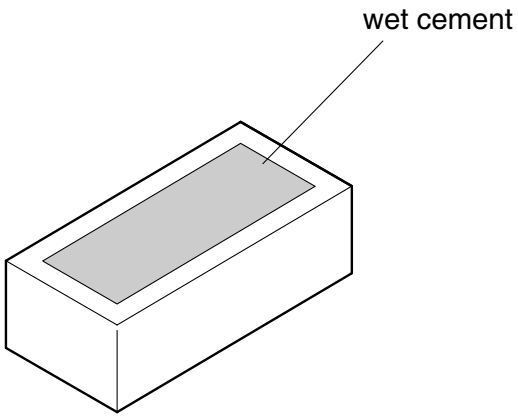


Fig. 11.3

The brick now has a mass of 2.91 kg.

Compare this with the mass given in **(a)(ii)**. What does it tell you about the density of the wet cement?

.....

.....[3]

12 Fig. 12.1 shows a simplified diagram of the front of a cathode-ray oscilloscope (c.r.o.).

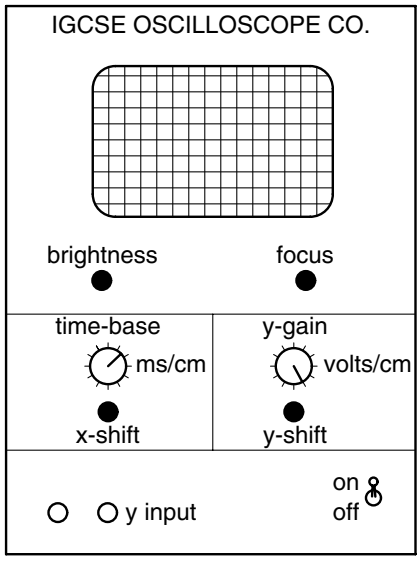


Fig. 12.1

(a) When the oscilloscope is switched on, a bright line is seen across the centre of the screen.

(i) What causes the bright line?

.....

.....

(ii) When the brightness control is turned up, the line gets brighter.

What happens inside the oscilloscope to cause this increase in brightness?

.....

.....[4]

(b) You have an alternating p.d. whose waveform you wish to display on the screen.

(i) Where would you connect this alternating p.d. to the oscilloscope? .....

(ii) Fig. 12.2 shows what the trace on the screen might look like.

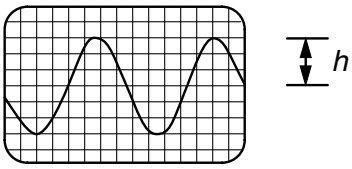


Fig. 12.2

1. Which oscilloscope control would you adjust to vary the amplitude, *h*, of the trace on the screen? .....
2. Which control would you adjust to vary the number of waves visible on the screen?

   .....
3. What would you see on the screen if you switched the time-base setting to zero?

   .....
   [4]

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